CLAIMS

1. A method of delivering a payload into the nucleus of a living cell, comprising contacting the cell with a hypercoiling carrier polymer which incorporates, or is otherwise associated with, said payload.

* * *

2. A method according to claim 1, wherein said hypercoiling carrier polymer incorporates said payload.

3. A method according to claim 2, wherein said payload forms part of the backbone of said hypercoiling carrier polymer.

4. A method according to claim 2, wherein said payload is tethered to the backbone of said hypercoiling carrier polymer.

5. A method according to claim 1, wherein said hypercoiling carrier polymer is associated with said payload, and forms a complex with said payload.

* * *

6. A method according to any one of claims 1 to 5, wherein the carrier polymer is biocompatible.

7. A method according to any one of claims 1 to 6, wherein the carrier polymer is biodegradable.

* * *

8. A method according to any one of claims 1 to 7, wherein the carrier polymer does not have a carbon backbone.

9. A method according to any one of claims 1 to 7, wherein the carrier polymer is not a vinyl polymer.

10. A method according to any one of claims 1 to 9, wherein the carrier polymer has a backbone having amide linkages.

11. A method according to any one of claims 1 to 10, wherein the carrier polymer is a polyamide.

12. A method according to any one of claims 1 to 10, wherein the carrier polymer has a backbone having peptide linkages.

13. A method according to any one of claims 1 to 10, wherein the carrier polymer is a polypeptide (protein).

14. A method according to any one of claims 1 to 10, wherein the carrier polymer has a backbone having pseudo-peptide linkages.

15. A method according to any one of claims 1 to 10, wherein the carrier polymer is a pseudo-polypeptide (pseudo-protein).

16. A method according to any one of claims 1 to 9, wherein the carrier polymer has a backbone having ester linkages.

17. A method according to any one of claims 1 to 9, wherein the carrier polymer is a polyester.

18. A method according to any one of claims 1 to 9, wherein the carrier polymer has a backbone having ester linkages and amide linkages.

19. A method according to any one of claims 1 to 9, wherein the carrier polymer is a poly ester amide.

* * *

20. A method according to any one of claims 1 to 19, wherein said hypercoiling carrier polymer is amphiphilic and has both hydrophobic regions and hydrophilic regions.

21. A method according to claim 20, wherein said hydrophilic regions are identical.

22. A method according to claim 20, wherein said hydrophilic regions are different.

23. A method according to any one of claims 20 to 22, wherein said hydrophobic regions are identical.

24. A method according to any one of claims 20 to 22, wherein said hydrophobic regions are different.

25. A method according to any one of claims 20 to 24, wherein said hydrophobic regions and hydrophilic regions alternate along the length of the backbone of the carrier polymer.

26. A method according to any one of claims 20 to 25, wherein each of said hydrophilic regions comprise one or more hydrophilic moieties.

27. A method according to any one of claims 20 to 26, wherein each of said hydrophobic regions comprise one or more hydrophobic moieties.

28. A method according to claim 27, wherein said hydrophobic moieties and hydrophilic moieties alternate along the length of the backbone of the carrier polymer.

* * *

29. A method according to any one of claims 20 to 28, wherein said carrier polymer has from 10 to 500 hydrophilic regions.

30. A method according to any one of claims 20 to 28, wherein said carrier polymer has from 10 to 500 hydrophobic regions.

31. A method according to any one of claims 26 to 28, wherein said carrier polymer has from 10 to 500 hydrophilic moieties.

32. A method according to any one of claims 26 to 28, wherein said carrier polymer has from 10 to 500 hydrophobic moieties.

33 A method according to any one of claims 20 to 32, wherein the ratio of hydrophilic regions to hydrophobic regions, by number, for the carrier polymer is from about 0.2 (1:5) to about 5 (5:1).

34. A method according to any one of claims 20 to 32, wherein the ratio of hydrophilic regions to hydrophobic regions, by number, for the carrier polymer is about 0.5 (1:2).

35. A method according to any one of claims 20 to 32, wherein the ratio of hydrophilic regions to hydrophobic regions, by number, for the carrier polymer is about 1 (1:1).

36. A method according to any one of claims 20 to 32, wherein the ratio of hydrophilic regions to hydrophobic regions, by number, for the carrier polymer is about 2 (2:1).

37. A method according to any one of claims 26 to 32, wherein the ratio of hydrophilic moieties to hydrophobic moieties, by number, for the carrier polymer is from about 0.2 (1:5) to about 5 (5:1).

38. A method according to any one of claims 26 to 32, wherein the ratio of hydrophilic moieties to hydrophobic moieties, by number, for the carrier polymer is about 0.5 (1:2).

39. A method according to any one of claims 26 to 32, wherein the ratio of hydrophilic moieties to hydrophobic moieties, by number, for the carrier polymer is about 1 (1:1).

40. A method according to any one of claims 26 to 32, wherein the ratio of hydrophilic moieties to hydrophobic moieties, by number, for the carrier polymer is about 2 (2:1).

* * *

41. A method according to any one of claims 20 to 40, wherein each hydrophobic region has a gram molecular weight of from about 14 to about 1000.

42. A method according to any one of claims 20 to 40, wherein each hydrophilic region has a gram molecular weight of from about 16 to about 1000.

43. A method according to any one of claims 26 to 40, wherein each hydrophobic moiety has a gram molecular weight of from about 14 to about 1000.

44. A method according to any one of claims 26 to 40, wherein each hydrophilic moiety has a gram molecular weight of from about 16 to about 1000.

* * *

45. A method according to any one of claims 1 to 44, wherein said carrier polymer has a molecular weight of from about 1 kDa to about 1 MDa.

46. A method according to any one of claims 1 to 44, wherein said carrier polymer has a molecular weight of from about 1 kDa to about 100 kDa.

47. A method according to any one of claims 1 to 44, wherein said carrier polymer has a molecular weight of from about 1 kDa to about 75 kDa.

48. A method according to any one of claims 1 to 44, wherein said carrier polymer has a molecular weight of from about 1 kDa to about 50 kDa.

49. A method according to any one of claims 1 to 44, wherein said carrier polymer and said payload have a combined molecular weight of from about 1 kDa to about 1 MDa.

50. A method according to any one of claims 1 to 44, wherein said carrier polymer and said payload have a combined molecular weight of from about 1 kDa to about 100 kDa.

51. A method according to any one of claims 1 to 44, wherein said carrier polymer and said payload have a combined molecular weight of from about 1 kDa to about 75 kDa.

52. A method according to any one of claims 1 to 44, wherein said carrier polymer and said payload have a combined molecular weight of from about 1 kDa to about 50 kDa.

* * *

53. A method according to any one of claims 26 to 52, wherein one or more of the hydrophobic moieties are selected from moieties derived from:

(a) an alkane, having from 1 to 20 carbon atoms;

(b) an alkene or an alkyne having from 2 to 20 carbon atoms;

(c) a cycloalkane, a cylcoalkene, or a cycloalkyne, having from 3 to 20 carbon atoms;

(d) a carboarene having from 6 to 20 ring carbon atoms;

(e) a heteroarene having from 5 to 20 ring atoms;

(f) a heterocycle having from 5 to 20 ring atoms;

(g) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a carboarene as defined above;

(h) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heteroarene as defined above; or,

(i) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heterocycle as defined above.

* * *

54. A method according to any one of claims 26 to 53, wherein one or more of the hydrophobic moieties are selected from moieties derived from compounds of the formula:

$$Q-G^1$$

wherein:

G^1 is a hydrophobic group; and

Q is independently a reactive functional group.

55. A method according to any one of claims 26 to 53, wherein one or more of the hydrophobic moieties are selected from moieties derived from compounds of the formula:

$$Q-G^2-Q$$

wherein:

G^2 is a hydrophobic group; and

each Q is independently a reactive functional group.

56. A method according to claim 54 or 55, wherein said hydrophobic group, G^1 or G^2, is selected from moieties derived from:

(a) an alkane, having from 1 to 20 carbon atoms;

(b) an alkene or an alkyne having from 2 to 20 carbon atoms;

(c) a cycloalkane, a cylcoalkene, or a cycloalkyne, having from 3 to 20 carbon atoms;

(d) a carboarene having from 6 to 20 ring carbon atoms;

(e) a heteroarene having from 5 to 20 ring atoms;

(f) a heterocycle having from 5 to 20 ring atoms;

(g) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a carboarene as defined above;

(h) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heteroarene as defined above; or,

(i) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heterocycle as defined above.

57. A method according to any one of claims 54 to 56, wherein said reactive functional group, Q, or each of said reactive functional groups, Q, is selected from:

(i) reactive acyl groups;

(ii) hydroxy groups; and,

(iii) amino groups.

58. A method according to any one of claims 54 to 56, wherein said reactive functional group, Q, or each of said reactive functional groups, Q, is a reactive acyl group, -C(=O)X, selected from:

(a) carboxylic acid, where X is -H;

(b) acyl halides, where X is halogen;

(c) acid anhydrides, where X is -OC(=O)R^{AN}, wherein R^{AN} is an acid anhydride substituent;

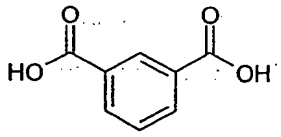
(d) esters, where X is -OR^{E}, wherein R^{E} is an ester substituent.

59. A method according to any one of claims 54 to 58, wherein said hydrophobic group, G^1 or G^2, is derived from a carboarene having from 6 to 20 ring carbon atoms.

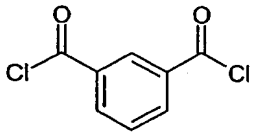
60. A method according to any one of claims 54 to 58, wherein said hydrophobic group, G^1 or G^2, is derived from benzene.

61. A method according to any one of claims 55 to 58, wherein said hydrophobic group, G^2, is 1,3-phenylene.

62. A method according to any one of claims 26 to 52, wherein one or more of the hydrophobic moieties are selected from moieties derived from the following compounds:



iso-phthalic acid



iso-phthaloyl chloride

63. A method according to any one of claims 54 to 58, wherein said hydrophobic group, G^1 or G^2, is derived from:
(a) an alkane, having from 1 to 20 carbon atoms.

64. A method according to any one of claims 55 to 58, wherein said hydrophobic group, G^2 is -$(CH_2)_p$-, wherein p is an integer from 1 to 10.

65. A method according to any one of claims 26 to 52, wherein one or more of the hydrophobic moieties are selected from moieties derived from the following compounds, wherein p is an integer from 1 to 10:

66. A method according to any one of claims 54 to 58, wherein said hydrophobic group, G^1 or G^2, is derived from

(h) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heteroarene as defined above.

67. A method according to any one of claims 26 to 52, wherein one or more of the hydrophobic moieties are selected from moieties derived from the following compounds: tryptophan, 5-hydroxy-tryptophan, tryptamine, desaminotryptophan.

68. A method according to any one of claims 54 to 58, wherein said hydrophobic group, G^1 or G^2, is derived from:

(g) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a carboarene as defined above.

69. A method according to any one of claims 26 to 52, wherein one or more of the hydrophobic moieties are selected from moieties derived from the following compounds: tyrosine, meta-tyrosine, ortho-tyrosine, desaminotyrosine, tyramine.

* * *

70. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties bears a charge, or is capable of bearing a charge, in an aqueous environment, and wherein that charge is neutralized above a predetermined pH, or below a predetermined pH, which predetermined pH falls in the range of about pH 4-9.

71. A method according to claim 70, wherein the charge is anionic.

72. A method according to claim 70, wherein the charge is cationic.

73. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties bears a chargeable group, or a salt thereof, wherein the pH, at which the chargeable group exists in equilibrium with equal amounts of the electrically neutral form and the ionic form, is in the range of about pH 4 to about pH 9.

74. A method according to claim 73, wherein the chargeable group, when charged, is anionic.

75. A method according to claim 73, wherein the chargeable group, when charged, is cationic.

76. A method according to claim 70 or 73, wherein one or more of the hydrophilic moieties is a weak Bronsted acid or a weak Bronsted base.

77. A method according to claim 70 or 73, wherein one or more of the hydrophilic moieties is a weak Bronsted acid characterized by pK_a values in the range of about 3 to about 8.

78. A method according to claim 77, wherein said weak Bronsted acid is a carboxylic acid.

79. A method according to claim 70 or 73, wherein one or more of the hydrophilic moieties is a weak Bronsted base characterized by pK_a values in the range of about 5 to about 12.

* * *

80. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties bears a carboxylic acid group or a salt thereof.

81. A method according to claim 80, wherein the pH at which the carboxylic acid group exists in equilibrium with equal amounts of the neutral acid form (-C(=O)OH) and the anionic base from ($-C(=O)O^-$) is in the range of about pH 4 to about pH 9.

* * *

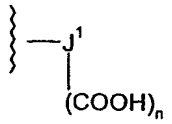
82. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties bears an amino base group selected from:
a primary amino group ($-NH_2$);
a pendant secondary amino group (-NHR);
a non-pendant non-cyclic secondary amino group (-NH-);
a cyclic secondary amino group (-NH-);
a pendant tertiary amino group ($-NR_2$);
a non-pendant non-cyclic tertiary amino group (-NR- or -N=); or
a cyclic tertiary amino group (-NR- or -N=);
or a salt thereof.

83. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties bears an amino base group selected from:
a primary amino group ($-NH_2$);
a pendant secondary amino group (-NHR); or
a pendant tertiary amino group ($-NR_2$);
or a salt thereof.

84. A method according to claim 82 or 83, wherein the pH at which the amino base group exists in equilibrium with equal amounts of the neutral base form and the cationic acid from is in the range of about pH 4 to about pH 9.

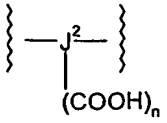
* * *

85. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties of the formula:



wherein:
J^1 is core group; and
n is an integer from 1 to 4.

86. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties of the formula:



wherein:

J^2 is core group; and

n is an integer from 1 to 4.

87. A method according to claim 85 or 86, wherein said core group, J^1 or J^2, is selected from moieties derived from:

(a) an alkane, having from 1 to 20 carbon atoms;

(b) an alkene or an alkyne having from 2 to 20 carbon atoms;

(c) a cycloalkane, a cylcoalkene, or a cycloalkyne, having from 3 to 20 carbon atoms;

(d) a carboarene having from 6 to 20 ring carbon atoms;

(e) a heteroarene having from 5 to 20 ring atoms;

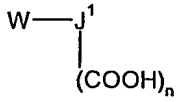
(f) a heterocycle having from 5 to 20 ring atoms;

(g) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a carboarene as defined above;

(h) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heteroarene as defined above; or,

(i) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heterocycle as defined above.

88. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties derived from compounds of the formula:



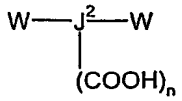
wherein:

J^2 is core group;

n is an integer from 1 to 4; and,

W is independently a reactive functional group.

89. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties derived from compounds of the formula:



wherein:

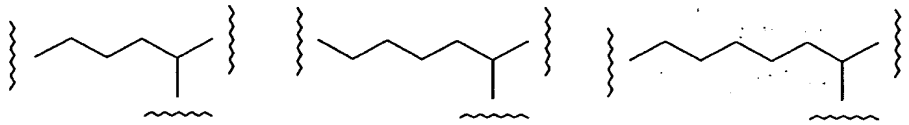
J^2 is core group;

n is an integer from 1 to 4; and,

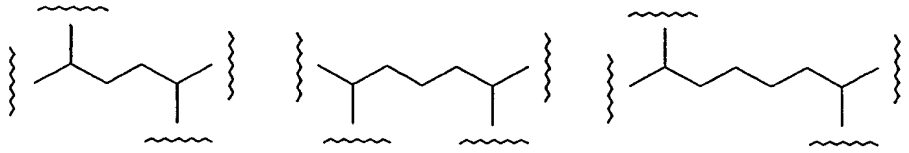
each W is independently a reactive functional group.

90. A method according to any one of claims 85 to 89, wherein J^1 and/or J^2 is independently a core group derived from an alkane having from 1 to 10 carbon atoms.

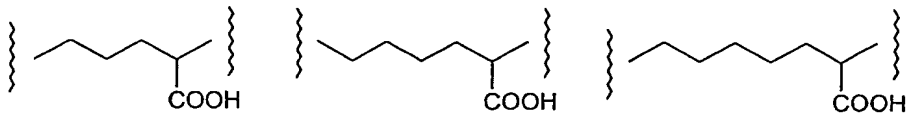
91. A method according to claim 86 or 89, wherein n is 1 and J^2 is independently selected from:



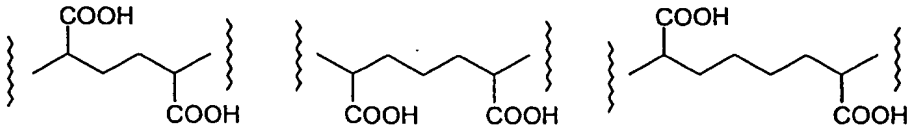
92. A method according to claim 86 or 89, wherein n is 2 and J^2 is independently selected from:



93. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties of the formula:



94. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties of the formula:

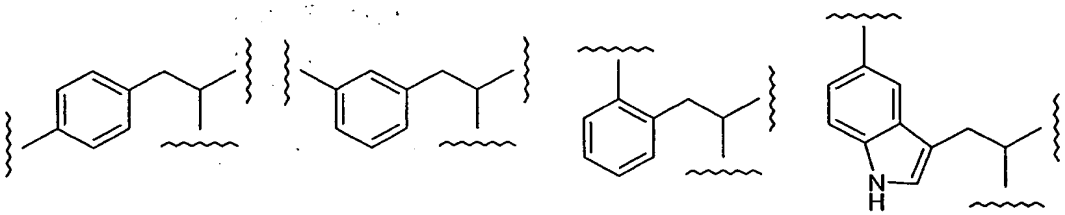


95. A method according to any one of claims 85 to 89, wherein J^1 and/or J^2 is independently a core group derived from:

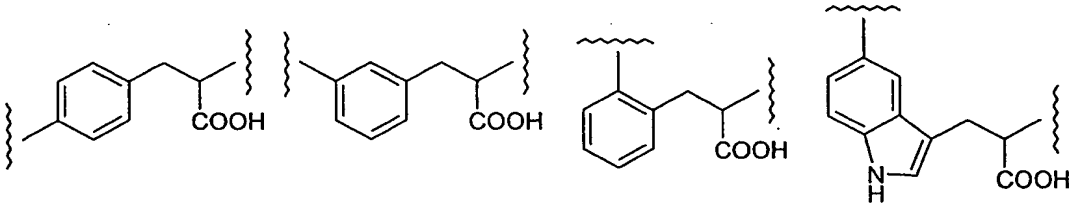
(g) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a carboarene as defined above; or

(h) an alkane, an alkene, an alkyne, a cycloalkane, a cylcoalkene, or a cycloalkyne, as defined above, attached to a heteroarene as defined above.

96. A method according to claim 86 or 89, wherein n is 1 and J^2 is independently selected from:



97. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties of the formula:



98. A method according to any one of claims 88 to 97, wherein said reactive functional group, W, or each of said reactive functional groups, W, is selected from:

(i) reactive acyl groups;

(ii) hydroxy; and,

(iii) amino groups.

99. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties derived from amino acids.

100. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties derived from the following compounds: 2,4-diaminopropionic acid; 2,4-diaminobutyric acid; ornithine; lysine; 2,6-diaminopimelic acid.

101. A method according to any one of claims 26 to 69, wherein one or more of the hydrophilic moieties are selected from moieties derived from the following compounds: tyrosine, meta-tyrosine, ortho-tyrosine, 5-hydroxy-tryptophan.

* * *

102. A method according to any one of claims 26 to 69, wherein one or more of the hydrophobic moieties of the carrier polymer are independently a hydrophobically-modified hydrophilic moiety.

103. A method according to claim 102, wherein the hydrophilic moiety of the hydrophobically-modified hydrophilic moiety bears a pendant carboxylic acid group that has been derivatized to bear a hydrophobic group.

104. A method according to claim 102, wherein the hydrophilic moiety of the hydrophobically-modified hydrophilic moiety bears a pendant carboxylic acid group that has been derivatized to bear a hydrophobic group by reaction with a hydrophobic amino acid to form a hydrophobic pendant amide of the hydrophobically-modified hydrophilic moiety.

105. A method according to claim 102, wherein the hydrophilic moiety of the hydrophobically-modified hydrophilic moiety is selected from lysine, β-aspartic acid, and malic acid.

106. A method according to claim 102, wherein the hydrophobically-modified hydrophilic moiety is selected from: alanine-, valine-, norvaline-, leucine-, isoleucine-, norleucine-, phenylalanine-, phenylglycine-, tyrosine-, and tryptophan-modified lysine, β-aspartic acid, and malic acid.

107. A method according to any one of claims 102 to 106, wherein one or more of the hydrophilic moieties of the carrier polymer corresponds to one or more of the hydrophilic moieties of the hydrophobically-modified hydrophilic moieties which are hydrophobic moieties of the carrier polymer.

* * *

108. A method according to any one of claims 1 to 13 and 20 to 52, wherein the carrier polymer is a co-polymer of:

(a) a monomer selected from iso-phthalic acid and iso-phthaloyl chloride; and,

(b) a monomer selected from 2,4-diaminopropionic acid; 2,4-diaminobutyric acid; ornithine; lysine; or 2,6-diaminopimelic acid.

109. A method according to claim 108, wherein the carrier polymer is poly(lysine iso-phthalamide).

* * *

110. A method according to any one of claims 1 to 109, wherein the payload consists of one or more payload moieties.

111. A method according to any one of claims 1 to 110, wherein the payload is homogeneous.

112. A method according to any one of claims 1 to 110, wherein the payload is heterogeneous.

113. A method according to any one of claims 1 to 112, wherein the payload consists of from 1 to 1000 payload moieties.

114. A method according to any one of claims 110 to 113, wherein the ratio of payload moieties to carrier polymer molecules, by number, is from about 1 (1:1) to about 1000 (1000:1).

115. A method according to any one of claims 110 to 113, wherein each payload moiety has a gram molecular weight of from about 50 to about 30,000.

116. A method according to any one of claims 110 to 113, wherein each payload moiety has a gram molecular weight of from about 100 to about 10,000.

117. A method according to any one of claims 110 to 113, wherein each payload moiety has a gram molecular weight of from 10^4 to about 10^6.

118. A method according to any one of claims 110 to 113, wherein each payload moiety has a gram molecular weight of from 10^5 to about 10^8.

* * *

119. A method according to any one of claims 1 to 118, wherein the payload has therapeutic value.

120. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties are, or comprise, biologically active agents selected from:

(a) drugs, prodrugs, chemo-therapeutics, radio-therapeutics, neutron capture agents;

(b) peptides, proteins, antibodies, antibody fragments, enzymes, transcription factors, signalling proteins, antisense peptides, zinc fingers, peptide vaccines; and,

(c) nucleotides, oligonucleotides, plasmids, nucleic acids.

121. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties are, or comprise, biologically active agents selected from:

(a) drugs, prodrugs, chemo-therapeutics, radio-therapeutics, neutron capture agents; and

(b) peptides, proteins, antibodies, antibody fragments, enzymes, transcription factors, signalling proteins, antisense peptides, zinc fingers, peptide vaccines.

122. A method according to any one of claims 1 to 118, wherein the payload has diagnostic value.

123. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties are, or comprise, detectable labels selected from:

(a) fluorophores;

(b) chromophores;

(c) isotopically enriched species;

(d) paramagnetic species;

(e) radioactive species; and,

(f) scintillents and phosphors.

124. A method according to any one of claims 1 to 118, wherein the payload has both therapeutic value and diagnostic value.

* * *

125. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is a cyanine dye or a derivative thereof.

126. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is a chelating group capable of complexing with a detectable label.

127. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is a drug.

128. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is a boron-containing moiety.

129. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is, or comprises, a peptide.

130. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is, or comprises, a nucleic acid.

131. A method according to any one of claims 110 to 118, wherein one or more of the payload moieties is, or comprises, a cationic nucleic acid complex.

132. A method according to any one of claims 1 to 131, wherein the carrier polymer further comprises other regions and/or moieties selected from: spacer groups, water solubilizing groups, and targeting ligands.

133. A method according to any one of claims 1 to 131, wherein the carrier polymer further comprises water solubilizing groups selected from: polyethylene glycol (PEG), poly ethylene oxide (PEO), polyvinyl alcohol (PVA), hydroxylpropylmethyl alchohol (HPMA), and dextran groups.

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134. A method according to any one of claims 1 to 133, wherein the carrier polymer which incorporates the payload, or the carrier polymer and the otherwise associated payload, enters or is capable of entering living cells rapidly.

135. A method according to any one of claims 1 to 133, wherein a fraction of the carrier polymer which incorporates the payload, or the carrier polymer and the otherwise associated payload, when placed in contact with living cells, enters or is capable of entering the cells within an entry time which is relatively short.

136. A method according to claim 135, wherein the fraction is a detectable fraction.

137. A method according to claim 135, wherein the fraction is at least about 1% by weight of the carrier polymer which incorporates the payload, or the carrier polymer and the otherwise associated payload, which is placed in contact with cells.

138. A method according to claim 135, wherein the fraction is at least about 0.01 ng of the carrier polymer which incorporates the payload, or the carrier polymer and the otherwise associated payload, per cell.

139. A method according to any one of claims 135 to 138, wherein the entry time is less than about 3 hours.

140. Use of a hypercoiling carrier polymer for the delivery of a payload into the nucleus of a living cell, which carrier polymer incorporates, or is otherwise associated with, said polymer.

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141. A hypercoiling carrier polymer, as described in any one of claims 1 to 109.

142. A hypercoiling carrier polymer, which incorporates a payload, as described in any one of claims 1 to 139.

143. A hypercoiling carrier polymer, associated with a payload, as described in any one of claims 1 to 139.

* * *

144. A hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, for use in a method of treatment of the human or animal body by therapy.

145. Use of a hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, for the preparation of a medicament for the treatment of a condition which is treatable by said payload.

146. A method of treatment of a condition comprising administering to a patient suffering from said condition a therapeutically-effective amount of a hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, wherein said payload is a drug which treats said condition.

147. A hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, for use in a method of diagnosis practiced on the human or animal body.

148. A method of diagnosis of a condition comprising:

(a) administering to a patient an effective amount of a hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, wherein said payload is, or comprises, a detectable label;

(b) detecting the presence and/or location of said detectable label; and

(c) correlating said presence and/or location with said condition.

149. A method of imaging a cell comprising:

(a) contacting a living cell with a hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, further wherein said payload is, or comprises, a detectable label; and

(b) detecting the presence and/or location of said detectable label.

150. A method according to claim 149, further comprising the step of:

(c) forming an image of said cell using said presence and/or location data.

151. A method of imaging a patient, or a portion thereof, comprising:

(a) administering to said patient an effective amount of a hypercoiling carrier polymer which incorporates a payload, or which is otherwise associated with a payload, as described in any one of claims 1 to 139, further wherein said payload is, or comprises, a detectable label; and

(b) detecting the presence and/or location of said detectable label.

152. A method according to claim 151, further comprising the step of:

(c) forming an image of said patient, or portion thereof using said presence and/or location data.

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